

# **Developing a Biomass Resource Tracking System:**

## **Assessment of Existing Waste Materials Exchanges**

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**Prepared for:**

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## 1.0 INTRODUCTION

A biomass energy facility needs an adequate, steady supply of feedstock to minimize fuel price fluctuations/risks and to maintain its competitiveness. Compared to the fossil-fuel energy industry, the biomass energy supply industry remains a regional, loosely organized enterprise. This is largely due to biomass' inherent properties—it is geographically dispersed, it is largely a byproduct of other commercial activities, and its transportation costs are relatively high per unit of energy transported over a given distance due to its low density. Unless the facility is directly connected to a biomass fuel source (e.g., pulp and paper mills, sawmills), finding a steady source of biomass can be challenging.

One approach taken to increase productive uses for biomass energy resources is a materials exchange/information clearinghouse that brings together buyers and sellers of biomass. Several states and nonprofit groups have developed these “waste/materials exchanges” as a way to stimulate pollution prevention efforts, promote recycling, and reduce the amount of solid waste going to landfills. Some commercial entities have also delved into this arena. Nearly all of the existing materials exchanges are free to their users and accessible online via the Internet.

It is important to note that states may use other methods to help biomass energy facilities identify and obtain steady supplies of feedstock. Examples include: tracking primary products and residues from the forest products industry, tracking composition of municipal solid waste, and tracking the biomass supply shed (done by state universities). Such methods may be used in conjunction with a materials exchange and are complementary activities. Due to the time associated with researching and contacting the states, it is out of the scope of this report to identify all such complementary activities – they could be investigated in subsequent efforts.

This report focuses on the materials exchange because it is a more structured, comprehensive, and easily replicable tool. An exchange should be able to provide useful, reliable data and ultimately be used to generate supply contracts for BioPower project development. This report begins by discussing the types and locations of major biomass resources in the U.S. It then provides an overview of current materials exchanges and their attributes and concludes with a suggested next step, developing a guidebook for states.

## **2.0 BIOMASS FEEDSTOCK—TYPES AND LOCATION**

Biomass feedstock is a broad term and can be divided into three major categories: woody residues, agricultural residues, and energy crops.<sup>1</sup> This chapter provides an overview of these feedstocks and their geographic concentrations; it also briefly discusses other, lesser-used biomass materials (Antares Group Inc., 1999).

### **2.1 Woody Residues**

Woody residues include forest residues, primary mill residues, construction and demolition waste, yard trimmings, and “other” wood wastes typically embedded in the municipal waste stream.

#### **2.1.1 *Forest Residues***

Forest residues are generated from active forest management (timber stand improvement) and commercial logging operations. Forest management practices provide the opportunity to harvest tops and limbs from trees as well as to cull material and salvageable dead trees that were previously left in the forest as waste. They are found across the country, with the largest quantities in the southeast and west, specifically in Oregon, Washington, North Carolina, Georgia, California, New York, Virginia, Alabama, and Mississippi.

#### **2.1.2 *Primary Mill Residues***

Companies that use whole logs to create primary wood products (e.g., boards, panels, veneer, beams, pulp) generate primary mill residues. Classes of companies that create primary mill residues include sawmills, pulp and paper companies, and other millwork companies. These residues are usually in the form of bark, chips, sander dust, edgings, sawdust, or slabs. The largest quantities are in the western and southeastern regions of the country, specifically in Pennsylvania, Kentucky, Oregon, Washington, and Arkansas.

#### **2.1.3 *Construction & Demolition (C&D) Waste***

C&D waste is woody material generated from construction and demolition activity. It is often calculated based on the amount of residential and commercial building activity. Since it is correlated with housing and population, C&D waste is available across the U.S., but it is more plentiful in the more populous states. Specifically, the largest quantities of C&D waste are available in: California, Texas, Florida, New York, North Carolina, Georgia, Ohio, and Illinois.

#### **2.1.4 *Yard Trimmings***

Woody yard trimmings are an abundant source of wood sent to landfills. They are also generated from right-of-way trimming near roads, railways, and utility systems such as power lines. As with C&D waste, yard trimmings are widely dispersed, but are more abundant in populous states. Specifically, the largest quantities are found in California, Texas, New York, Florida, and Georgia.

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<sup>1</sup> Currently, in the U.S., energy crops for power generation are only being tested in pilot projects, but some researchers believe they have significant future potential.

### **2.1.5 Other Wood Waste**

“Other” waste wood comprises discarded consumer wood products and wood residues from non-primary mill manufacturers. This includes discarded wooden furniture, cabinets, pallets and containers, scrap lumber and panels from sources other than construction and demolition, and wood residues from manufacturing activities other than primary wood products mills. This wood waste is usually part of the municipal solid waste stream. It is not as abundant as the other types of woody biomass, and its largest quantities are found in California and Texas.

## **2.2 Agricultural Residues**

More than 95 million tons of agricultural waste is generated in the U.S. each year. (DOE/EREN, 2002) The two most abundant crops in the country in terms of average acreage planted are corn and wheat, so they are cited as examples here. The portions of the crops used for energy production are corn stover (leaves, stalks, and cobs) and wheat straw. Seven states in the farm belt are the largest producers of corn stover: Iowa, Illinois, Nebraska, Indiana, Minnesota, Ohio, and Wisconsin. Three states are primary wheat straw producers: Kansas, North Dakota, and Oklahoma.

## **2.3 Energy Crops**

Energy crops are crops developed and grown expressly for use as a power generation fuel. They are fast growing, drought and pest resistant, and readily harvestable. Energy crops include trees such as poplar and eucalyptus, shrubs, and grasses such as switchgrass. They can be grown on agricultural land not needed for food, feed, or fiber. It is estimated that about 190 million acres of land in the U.S. could be used to produce energy crops. (DOE/EREN, 2002)

Since switchgrass is already used in the U.S. for forage, ground cover, erosion control, and decoration, it is cited here as an example. It is a perennial crop that can grow up to 10 feet high and its extended root structure protects against erosion. The largest quantities of switchgrass could be harvested in the central portion of the country, specifically in North Dakota, Missouri, South Dakota, Kansas, Ohio, Tennessee, Mississippi, Texas, and Iowa.

## **2.4 Other Biomass Feedstock**

Other lesser-used biomass feedstocks include animal waste, sludge, and tires. These items are more geographically confined than those listed above so they may be suited for a limited number of waste exchanges. Poultry litter (chicken and turkey), hog manure, and cattle manure have high heating values, which make them potential fuel sources. Sludge is a by-product of paper mill activity and wastewater treatment plants. Approximately 78% of the scrap tires generated in the U.S. annually are dumped, landfilled, or stockpiled. Animal waste, sludge, and tires are not commonly used as power generation fuel for various reasons: the presence of alternate higher value markets, expense and difficulty in gathering the material, potential environmental problems, and negative public perception. These issues could also adversely affect their viability and success in a materials exchange.

### 3.0 Current Materials Exchanges

Biomass is the feedstock for a variety of commercial energy activities. Fuels and power production are two major consumers. For example, generation of 1 MW of electricity can consume from 5,500 to 7,500 dry tons of biomass per year depending on the power plant efficiency. A 20 MW facility is an average size requiring up to **150 dry tons per year**. This is a useful benchmark for gauging the ability of waste exchanges to meet large commercial feedstock demands. Materials exchanges offer an easy opportunity for buyers and sellers to come together. There are three types of materials exchanges currently in operation: state-run, nonprofit, and commercial. This section provides an overview of each, including general characteristics of the state-run exchanges. Because most materials exchanges involve multiple materials/waste categories, this report does not address dedicated biomass exchanges.

#### 3.1 State-run Materials Exchanges

*“Since 1992 more than 650,000 tons of materials have been diverted from landfills and over 5.5 million dollars have been saved through CalMAX.” – California*

*“The program has directly fostered material transactions between companies that generated more than \$204.4 million in cost savings. More than 2,494 million gallons or gallon equivalents of material have been diverted from landfill disposal in the process.” – Illinois*

*“Since 1990, the program has diverted over 747,274 tons of waste material from disposal and saved businesses more than \$20 million in disposal costs.” – Iowa*

*“Since 1988, it has assisted in the successful exchange of 782 million pounds of material, saving participating firms more than \$9 million in avoided disposal costs, while helping them earn almost \$7 million from the sale of materials.” – Texas*

Thirteen state governments currently operate some type of materials exchange; they are listed below. As shown by the above quotes,<sup>2</sup> there have been modest successes from a biomass perspective. These exchanges are designed for people interested in buying or selling in-state materials. Since a primary goal of the exchanges is to reduce overall solid waste disposal, they include a variety of waste categories, not just biomass materials. Table 3-1 lists the various biomass categories included in these exchanges.<sup>3</sup>

- |              |                  |
|--------------|------------------|
| • Alaska     | • Iowa           |
| • Arkansas   | • Kentucky       |
| • California | • Mississippi    |
| • Delaware   | • North Carolina |
| • Georgia    | • Ohio           |
| • Illinois   | • Texas          |
| • Indiana    |                  |

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<sup>2</sup> Quotes are from the materials exchanges' web sites.

<sup>3</sup> As of the date of this report, there was no information available on the Internet regarding materials exchanges in Delaware and Mississippi and access to Georgia's exchange is limited and password-protected.

**Table 3-1**  
**Biomass Categories Included in State-run Materials Exchanges**

<b>State</b>	<b>Wood</b>	<b>C&amp;D</b>	<b>Paper</b>	<b>Rubber</b>	<b>Organics</b>	<b>Ag. Waste</b>	<b>Manure, Sludge, &amp; Yard Waste</b>
Alaska	•	•	•	•			
Arkansas	•						
California	•	•	•	•	•		
Illinois	•		•	•			
Indiana	•	•	•	•			
Iowa	•	•	•	•	•		
Kentucky	•	•	•	•		•	
North Carolina	•	•	•	•			•
Ohio	•	•	•	•		•	
Texas	•	•	•	•			

### **3.1.1     *Typical Characteristics of State-Run Exchanges***

Nine of these exchanges have free online databases, available on the Internet. Online databases are efficient and offer the greatest ease of use. The user is allowed to search by material type and location. Most of the databases include the following: description of material, whether it is “available” or “wanted,” contact information, and material location. Some exchanges also include data on volume and the presence of contaminants, which is valuable information for the buyer. In most cases, the user can contact the buyer/seller directly, although there are some instances where state agency staff act as middlemen. Table 3-2 lists the unique characteristics of the various state-run materials exchanges. In cases where the characteristic is clearly positive (+) or negative (-), it is marked as such.

**Table 3-2**  
**Unique Characteristics of State-Run Exchanges**

<b>State-Run Materials Exchange</b>	<b>Unique Characteristics</b>
Alaska	<ul style="list-style-type: none"> <li>• No web site; only has a catalog (-)</li> <li>• Catalog is printed quarterly</li> </ul>
Arkansas	<ul style="list-style-type: none"> <li>• Has very detailed wood waste categories (+)</li> <li>• Database entries include volume, where available (+)</li> </ul>
California	<ul style="list-style-type: none"> <li>• Only items that currently have little or no market value can be listed as available (+)</li> <li>• Professional recyclers and brokers cannot list items</li> </ul>
Delaware	<ul style="list-style-type: none"> <li>• No information available—cannot access exchange on Internet (-)</li> </ul>
Georgia	<ul style="list-style-type: none"> <li>• Database access is limited and password protected (-)</li> <li>• State government staff act as middlemen</li> </ul>
Illinois	<ul style="list-style-type: none"> <li>• No online database, directory is available online for download</li> <li>• State government staff act as middlemen</li> <li>• Confidentiality guaranteed</li> </ul>
Indiana	<ul style="list-style-type: none"> <li>• Has “listserv” feature that sends user an email about new listings/database updates (+)</li> <li>• Database entries include volume, where available (+)</li> </ul>
Iowa	<ul style="list-style-type: none"> <li>• Publishes a quarterly newsletter (+)</li> <li>• Provides access to resource specialists for one-on-one business assistance (+)</li> <li>• Database entries include volume, where available (+)</li> <li>• Only includes “available” materials, not “wanted” (-)</li> <li>• Confidential</li> </ul>
Kentucky	<ul style="list-style-type: none"> <li>• Where available, database entries include presence of contaminants (+)</li> </ul>
Mississippi	<ul style="list-style-type: none"> <li>• No information available on the Internet; web site address not working (-)</li> </ul>
North Carolina	<ul style="list-style-type: none"> <li>• Database entries include volume (where available), availability of transportation, and presence of contaminants (+)</li> </ul>
Ohio	<ul style="list-style-type: none"> <li>• Gives users the option to list items confidentially</li> <li>• Includes listings from several nearby states (+)</li> <li>• Database entries include volume, where available (+)</li> </ul>
Texas	<ul style="list-style-type: none"> <li>• Gives users the option to list items confidentially</li> <li>• Has online database and catalog (+)</li> <li>• Database entries include volume, where available (+)</li> </ul>

### 3.1.2 State-Run Materials Exchange Example: North Carolina Waste Trader

The North Carolina Department of Environment and Natural Resources' materials exchange is discussed here as an example to illustrate the web-based exchange's ease of use. Below, the home page of *The North Carolina Waste Trader* is shown. Three options are given to the user: viewing available materials, viewing wanted materials, and logging-in to list additional materials.

[home](#)Page 1 of 1

# NORTH CAROLINA WasteTrader

**Materials Available**

Welcome to **NC WasteTrader**, North Carolina's marketplace for discarded or surplus materials and products. This waste exchange service is designed to divert recoverable materials from disposal while providing feedstocks and supplies to potential users.

-  [View Materials Available](#)
-  [View Materials Wanted](#)
-  [List Materials On WasteTrader \(login\)](#)

**Materials Wanted**

**Need Help?**

- [Directory of Markets for Recyclable Materials](#)
- [Local Government Waste Reduction Programs/Contacts](#)
- [Links to Other Exchanges](#)
- [Join the P2Assist Listserv](#)
- [State Energy Office](#)

[NCGov.com](#) • [DENR Customer Service](#) • [Disclaimer](#)

 **North Carolina Department of Environment and Natural Resources**

North Carolina Division of Pollution Prevention and Environmental Assistance (DPPEA)  
1639 Mail Service Center • Raleigh NC 27699-1639 • (919) 715-6500 • (800) 763-0136

<http://www.ncwastetrader.org/home.aspx>12/30/02

If the user clicks on “View Materials Available,” the user views the screen shown below and on the next page.

NC WasteTrader - List of Available Materials
Page 1 of 2

# N O R T H C A R O L I N A

# WasteTrader

[Materials Available](#)
[Materials Wanted](#)
[Need Help?](#)

**List of waste materials available:**

Date listed ▼
Descending ▼
Sort

Material Name	Amount on Hand	Frequency Available	City	State	Date Listed
Floor Carpet w/polyurethane backing	20 yards	daily	Various	NC, SC	12/23/02
Rubber Dust	15yd	Daily	Jefferson	NC	12/18/02
red three-hole bored brick	100s tons	one time	Rock Hill	South Carolina	12/18/02
wood chips	200 tons	continuous	Winston-Salem	NC	11/20/02
Kure-n-seal	165 gallons	one time	Winston-Salem	NC	11/07/02
Certi-vex AC 309	55 gallons	one time	Winston-Salem	NC	11/07/02
1-pint tub w/ lid	5000 units	one time	Concord	NC	11/01/02
Solid Wood, Crates	50 -100 per week	continuous	Sanford	NC	10/29/02
Polyester Upholstery Trimmins	200,000 lbs	One time	Spindale	NC	10/28/02
Ammonium Sulfate Solution	10,000 gallons	continuous			10/25/02
Fiber Board	300,000 cubic yards	continuous	Mt. Gilead	North Carolina	10/25/02
BELTS-PURSES-SUITCASES	350 POUNDS	MONTHLY	SWANSBORO	NC	10/09/02
USED SHOES	300 PAIRS	MONTHLY	SWANSBORO	NC	10/09/02
USED CLOTHING	5000 POUNDS	MONTHLY	SWANSBORO	NC	10/09/02
USED CLOTHING	14,000 POUNDS	MONTHLY	SWANSBORO	NC	10/09/02
USED CARDBOARD	3000 POUNDS	MONTHLY	SWANSBORO	NC	10/09/02
USED MATTRESSES	25	MONTHLY	SWANSBORO	NC	10/09/02
Virgin Activated Carbon	3 - 45 gal. drums	one-time	Moncure	NC	09/26/02
Wood Fibers - Pine	1000 Tons	continuous	Mt. Gilead	North Carolina	09/05/02

<http://www.ncwastetrader.org/MaterialAvailableList.aspx>
12/30/02

Pallets	10 tons	continuous	Charlotte	NC	08/28/02
Mill Scale - Iron Oxide	25,000 tons	continuous	Charlotte	NC	08/28/02
Mixed solvents light	1000 gallons	Monthly	Charlotte	NC	08/22/02
Scrap Wood	250 pounds	continuous	Pittsboro	North Carolina	08/02/02
Toluene	200 gallons	monthly	Whiteville	N.C.	07/29/02
Lumber, Wood, Pallet Parts	4 tons	continous	Denver	NC	07/24/02

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By selecting "lumber, wood, pallet parts," the user then views the following screen.

MaterialFullInfo
Page 1 of 1

# N O R T H C A R O L I N A

# WasteTradeR

Materials Available
Materials Wanted
Need Help?

Material Information		Contact Information
<b>Material Type:</b>		<b>Name:</b> Ives Zaldumbide
<b>Material Name:</b>	Lumber, Wood, Pallet Parts	<b>Title:</b>
<b>Hazardous Material:</b>	No	<b>Company:</b> Tree Brand Packaging, Inc.
<b>Type of process this material is from:</b>	Pallets, Sawmill	<b>Telephone:</b> 704-483-0719
<b>Known contaminants:</b>		<b>FAX:</b> 704-483-3735
<b>Additional information:</b>	Hardwood scrap and pallet parts	<b>E-mail:</b> ives@treebrand.com
<b>Physical state:</b>	solid, bundled	<b>Mailing Address:</b>
<b>Potential use:</b>	fuel, landfill, mulch	7971 Graham Road
<b>Amount of material on-hand:</b>	4 tons	Denver, NC 28037
<b>Packaging of material:</b>	banded, banded on pallets	
<b>Frequency available:</b>	continous	
<b>Future quantities of material:</b>	approximately 2 tons per week	
<b>Producer will transport material:</b>	Yes	
<b>Location of the material:</b>	7971 Graham Road Denver, 28037	

**Important Notice**

This waste exchange exists solely as a forum for information between traders of recyclable and reusable commodities. Information provided herein is supplied by the entities listing materials. It has been created for the purpose of fostering the legal exchange, reuse and recycling of materials that would otherwise become waste products. Neither the N.C. Division of Pollution Prevention and Environmental Assistance (DPPEA), the N.C. Department of Environment and Natural Resources (DENR) nor any members/agents thereof are liable for any information, error or misrepresentation, and make no warranty, expressed or implied, as to the accuracy of the descriptions, suitability of the materials for particular purposes, or the merchantability of any materials offered, listed or described. DPPEA and DENR are not responsible for determining what may constitute a hazardous substance or create a hazardous situation, nor do they make or express any judgment with respect to any legal requirement, particularly for the storage, transportation, treatment, recovery or disposal of any material. DPPEA reserves the right to withhold or delete listings and to edit information provided by the listing party.

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<http://www.ncwastetrader.org/MaterialFullInfo.aspx?ID=70>
12/30/02

### 3.2 Nonprofit and Commercial Materials Exchanges

Twenty states are home to nonprofit rather than state government-run materials exchanges; these exchanges also operate intra-state. Nonprofit groups or universities usually run them. They are structured similarly to the state-run exchanges; most have free online databases, available via the Internet, and include the same type of information about available and wanted materials. The 20 states with nonprofit materials exchanges are:

- |                 |                  |
|-----------------|------------------|
| • Colorado      | • New Hampshire  |
| • Connecticut   | • New Jersey     |
| • Hawaii        | • New York       |
| • Kansas        | • Oklahoma       |
| • Maine         | • Rhode Island   |
| • Massachusetts | • South Carolina |
| • Minnesota     | • Tennessee      |
| • Montana       | • Vermont        |
| • Nebraska      | • West Virginia  |
| • Nevada        | • Wisconsin      |

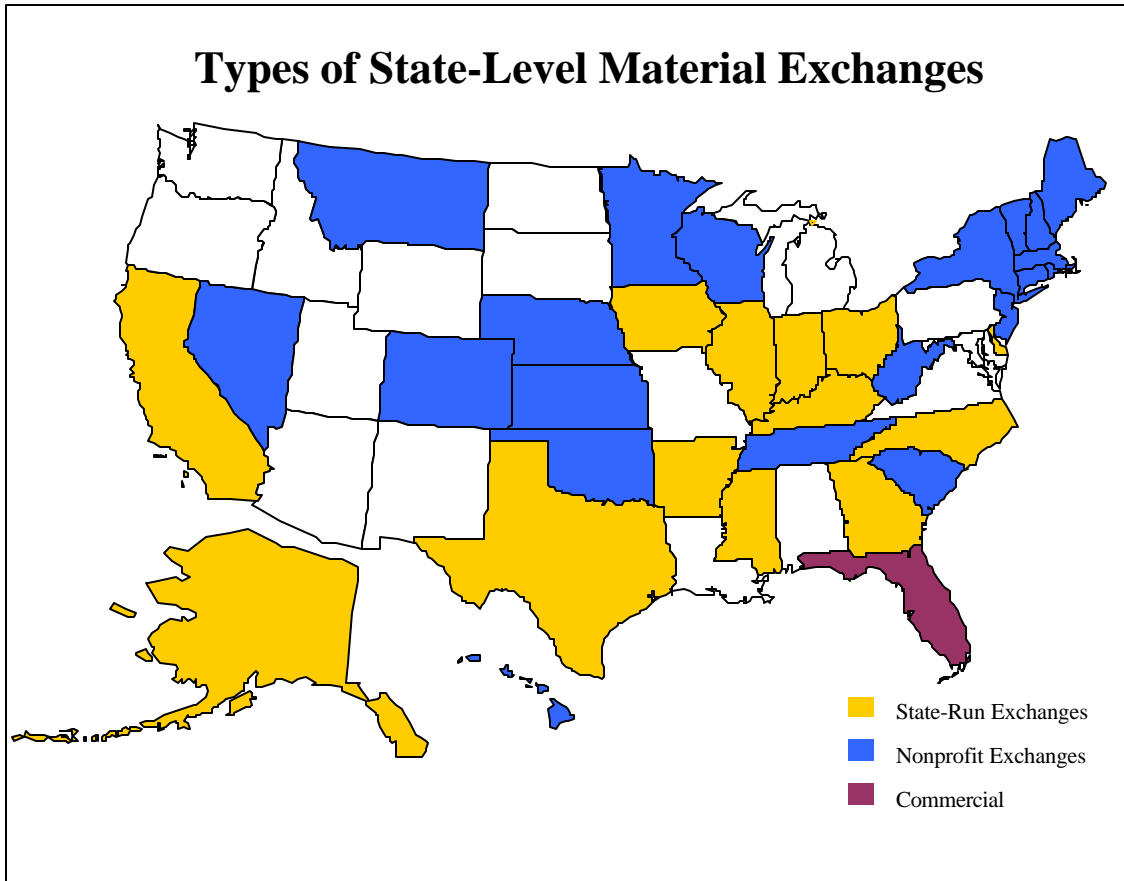
There are also several commercial materials exchanges, which are usually broader in geographic scope than simply the state-level - regional, national, and sometimes, international. The exception is Florida, which has its own commercial exchange.

Two wood-based commercial exchanges are briefly discussed here – WoodFuel.com and the International Wood Exchange Index. As referred to in its name, WoodFuel.com is an exchange that focuses on using biomass as an energy resource. Users have to register and create accounts to access the site, but getting an account is free. The web site provides an overview of renewable energy and the biomass industry (including its environmental benefits), and updates on relevant legislation.

The “Intercontinental Wood Exchange Index” is based in Ontario, Canada. Its online database contains a worldwide listing of wood material suppliers and buyers. It is not a waste wood exchange, but it does include a miscellaneous wood category that includes waste wood. Users can add and respond to listings for free. Each user is limited to a maximum of five free listings at any given time – for-fee services are available for those who wish to list more. The Intercontinental Wood Exchange Index’s web site is similar to the North Carolina Waste Trader. The Intercontinental Wood Exchange Index includes the following wood categories (subcategories show in parentheses): 1) Forestry and Logging (9 subcategories), 2) Lumber Industry (7 subcategories), 3) Softwoods/Coniferous/Gymnosperms (7 subcategories), 4) Hardwoods (29 subcategories), 5) Exotic Woods and Materials (14 subcategories), 6) Composite and Treated Wood Products (6 subcategories), 7) Home Construction and Building Products (12 subcategories), Woodworking (9 subcategories), and Other Wood Products & Services (8 subcategories including pelletized wood fuel).

### 3.3 Summary of State-level Materials Exchanges

A total of 34 states have some type of state-level exchange. They are illustrated in the map below.



## **4.0 NEXT STEP—A GUIDEBOOK FOR WASTE EXCHANGE DEVELOPMENT**

Materials exchanges evolved as a way to address growing solid waste management problems and pollution prevention issues. Although waste disposal is a ubiquitous problem, most states independently created their exchanges. Section 3 discussed the several common elements that materials exchanges share, regardless of location or ownership structure. States then add features to represent their unique situation and goals.

### **4.1 Outline for a Guidebook**

To learn from others' efforts and to "avoid reinventing the wheel," it is recommended that DOE develop a waste exchange development guidebook for states. Its target audiences would be states that want to create an Internet-based exchange or want to improve their current one. The benefit for DOE is the value of the database information in developing and monitoring national and regional biomass supply curves. As illustrated in Section 3, fourteen states do not have an Internet-based materials exchange<sup>4</sup> and several existing exchanges need improvement. The guidebook could provide specific directions concerning how to create and launch an Internet-based materials exchange, for a range of solid waste components. These directions could also be used by those states wishing to create a materials-specific exchange (e.g., only biomass materials). To provide an idea of what the guidebook might contain, an Outline of Contents is presented on the next page. This list is based on the research and preliminary analysis done for this report. Information would be gleaned from the best practices of existing, successful exchanges.

### **4.2 Other Considerations**

Care should be taken to avoid competing with commercial exchanges such as the "WoodFuel.com" exchange. This could be accomplished by allowing the commercial exchanges to be listed on the state run exchanges with the idea that these sites provide broader commercial services to assist buyers to contract for supplies.

To be successful, participation in the exchange must be high. This may require a very targeted and intensive outreach campaign in the early stages. The exchange will grow if customers and sellers are successful. DOE could provide assistance in helping the states to identify the target waste generators and buyers. DOE could also promote the exchanges on its national websites for biomass. It might be useful to adopt some of the strategies used by very successful online auctions such as eBay. In these successful Internet-based exchanges, the seller pays the transaction fee only for successful sales. To accomplish this, the states may want to set up the site framework but allow private firms to bid for operating the site; successful firms will handle and profit from the transactions while paying the state a small royalty for the operating license.

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<sup>4</sup> Four of these states do have an exchange/directory, but they are not Internet-based.

## **Guidebook for Developing a State-Level Materials Exchange Outline of Contents**

- I. What is an Online Materials Exchange?
- II. Why Should a State Have an Online Materials Exchange?
- III. Who Can Use It?
- IV. What Items Options for Generating Revenue to Finance the Exchange?
- V. What are the Requirements for a Materials Exchange?
  - a. What Data are Needed?
    - i. Identify waste stream components and geographic origin
    - ii. Identify quantities of waste
    - iii. Identify percent of waste that is recycled, reused, disposed
    - iv. Identify presence of contaminants
    - v. Identify waste flow (e.g., % disposed in-state, % disposed out-of-state)
    - vi. Identify current materials exchanges (e.g., private companies; local efforts) to assess competition and avoid duplication of efforts
    - vii. Identify potential buyers and sellers, per waste category
  - b. What Information/Services are Provided?
    - i. The Online exchange is the Centerpiece
    - ii. Identify if a directory is also necessary
    - iii. Determine if a confidentiality option should be offered
    - iv. Determine if links to/merge with other exchanges should be offered (for more regional scope)
  - c. How is an Exchange Set Up On the Internet?
    - i. Identify database fields
    - ii. Create database structure
    - iii. Create web site
    - iv. Keep track of transactions and web site activity
  - d. How Should Information/Database Records be Updated?
    - i. Determine frequency of updates (e.g., quarterly, annually)
    - ii. Develop forms for participants to update their records
    - iii. Determine if periodic phone/email surveys are needed
- VI. Getting the Word Out
  - a. Identify potential PR/advertising tools
    - i. (Some samples will be included)
  - b. Identify existing marketing channels
  - c. Identify new marketing channels

## REFERENCES AND WEB SITES

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